High Energy Laser Systems Test Facility

Unique Laser Testing and Evaluation Range

The High Energy Laser Systems Test Facility (HELSTF) offers extensive capabilities and a robust infrastructure for testing and evaluating a wide array of laser technology programs and weapon systems. Located at White Sands Missile Range in southern New Mexico, HELSTF has access to 3,200 square miles of controlled land and 7,000 square miles of controlled air space in which to conduct live fire, lethality, vulnerability, and laser/material interaction testing for ground and above the horizon engagements.

Capabilities

HELSTF represents an approximately $880 million investment by the Department of Defense in high energy laser research, development, testing and evaluation (RDT&E) that includes such unparalleled capabilities as:

- **Mid-Infrared Advanced Chemical Laser (MIRACL)**: MIRACL is the first megawatt-class continuous wave chemical laser built in the free world and is the only laser in the United States that has attained average power at such high levels. This deuterium fluoride (DF) laser produces energy spectra of approximately 10 lasing lines between 3.6 and 4.0 microns. During its 18 years of operation, the MIRACL has accumulated approximately 3600 seconds of total lasing time in over 155 tests.

- **Sea Lite Beam Director (SLBD)**: The SLBD provides the capability to track highly maneuverable tactical targets and destroy them by delivering a focused MIRACL beam to a pre-selected aimpoint on the target's surface. Components include a large aperture gimbal-mounted telescope with a 1.8-meter uncooled primary mirror, eight water-cooled mirrors, a visible and infrared precision tracking system, alignment and stabilization subsystems, and a functional controller to allow for automatic operation. The SLBD also serve as a high-resolution imaging system that can record data of missile tests conducted at White Sands Missile Range.

- **Solid State Heat Capacity Laser (SSHCL)**: Developed jointly by the U.S. Army Space and Missile Command and Lawrence Livermore National Laboratory, the 10-kilowatt SSHCL became operational at HELSTF on August 30, 2001. The SSHCL's all electric operation and compact size represent a significant leap ahead technology to develop joint weapon systems to support the warfighter of the future.

- **Laser Demonstration Device**: A 5- to 15-kilowatt mid-infrared chemical laser that provides low-cost laser test capability for customers who do not need the full power of the MIRACL.

- **Pulsed Laser Vulnerability Test System (PLVTS)**: Operational since June 1992, PLVTS consists of a pulsed CO2 laser operating at 10.6 microns and a beam director that is used for multi-wavelength dynamic target illumination. PLVTS is capable of duplicating many threat tactical laser systems to support susceptibility and vulnerability testing of U.S. systems and components.

- **Beam Transfer Area (BTA)**: The BTA permits a large number of simultaneous tests during each MIRACL firing by rapidly switching the MIRACL beam between any of the numerous test areas at HELSTF, thereby reducing test costs for range customers.

- **Effects Test Area**: Provides an indoor controlled laboratory test environment for evaluating laser effects on non-explosive materials and small (less than one meter) components.

- **Hazardous Test Area**: Located approximately 975 yards downrange, the Hazardous Test Area allows for safe testing of large targets and targets that explode or release large quantities of gas/liquid. Extensive instrumentation is also available at this site.

- **Large Vacuum Chamber**: Can produce a vacuum equivalent to a 600,000-foot altitude and is the only large vacuum chamber in the country capable of allowing the entry of high-energy laser beams with power levels up to several hundred kilowatts.

- **Optical Maintenance Facility**: Provides on-site capability to characterize, clean, and install optical elements of any type.

HELSTF also offers a full range of data collection/processing, communications, meteorological, safety, machine/carpenter shop, logistical services, facilities maintenance, and security support to meet the mission requirements for all prospective range customers. With its unequalled capabilities, self-sufficient infrastructure, and dedicated team of professionals, HELSTF is clearly the optimal range to support a broad spectrum of high energy laser technology research, development, testing, and evaluation for the government and the private sector.

Since its initial construction in the early 1980s, HELSTF has effectively supported high energy laser systems and programs for each of the three uniformed services, the Missile Defense Agency, NASA, industry, and academia. Recently, the Tactical High Energy Laser (THEL) underwent successful testing and evaluation on site. Not content with its previous outstanding performance, HELSTF is transforming itself into an even more capable test range poised for the 21st century. HELSTF stands fully ready to accomplish its mission of providing high energy laser expertise to the warfighter and the nation by evaluating high energy laser technologies and operating the nation's sole extended range high energy laser test facility.

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